

Contributions to our Knowledge of the Arthropod Fauna of the West Indies.—Part I. Scorpiones and Pedipalpi; with a Supplementary Note upon the Freshwater Decapoda of St. Vincent. By R. I. POCKOCK, of the Natural History Museum. (Communicated by W. PERCY SLADEN, Sec. Linn. Soc.)

[Read 16th March, 1893.]

(PLATES XXIX. & XXX.)

THE following report upon the above-mentioned groups of Arthropoda is based upon the material obtained by the collectors in the employ of the Committee for the Exploration of the Fauna and Flora of the Lesser Antilles. But to render the report as complete as possible and of greater use to naturalists resident in the West Indies, descriptions are given of all the species that have been recorded from or that are otherwise known to exist in any of these islands. Trinidad, as being politically one of the West-Indian groups, has been here included, although zoologically this island is but a portion of the mainland of Venezuela.

It is a noticeable fact with regard to the Scorpion fauna of these islands, that whereas the species that are found in Cuba, Hayti, Jamaica, and Porto Rico occur also in Central or South America, those that are found in the Lesser Antilles are apparently peculiar to those islands.

Owing to the unsatisfactory state of our knowledge of the *families* of Scorpions, I have not in this paper adopted any names for groups of this rank. The synoptical table, however, that has been supplied of the *genera* will, it is hoped, remove all difficulties in the way of determining the genus of any species that may require a name.

The species that I have not seen are marked with an asterisk.

SCORPIONES.

Synopsis of the Genera of West-Indian Scorpions.

- a. The sternum of the cephalothorax laterally compressed, minute and triangular.
- a¹. The intervals between the large teeth forming the lateral series on the digits of the chelæ not occupied by denticles.

- a*³. The individual rows of the median series of teeth on the digits scarcely overlapping ISOMETRUS.
- b*². The individual rows of the median series of teeth overlapping for half their distance TITYUS.
- b*¹. The intervals between the teeth of the lateral series occupied by longitudinal series of denticles.
- a*³. Pectines only moderately dilated at the base; the first abdominal sternite not sulcate CENTRURUS.
- b*³. Pectines strongly dilated at the base; the first abdominal sternite bisulcate HETEROCTENUS, nov.
- b*. Sternum pentagonal or transversely elongate owing to antero-posterior compression.
- a*⁴. Sternum pentagonal, distinct and large.
- a*⁵. With a distinct and large tubercle beneath the aculeus.
- a*⁶. With three lateral eyes on each side DIPLOCENTRUS.
- b*⁶. With two lateral eyes on each side OICLUS.
- b*⁶. Without a tubercle beneath the aculeus.
- a*⁷. Tail strongly compressed; the anterior border of the carapace strongly excised in the middle; three lateral eyes; sternum as wide as long OPISTHACANTHUS.
- b*⁷. Tail not compressed; the anterior border of the carapace entire; two lateral eyes on each side; sternum wider than long BROTEOCHACTAS.
- b*⁴. Sternum transversely elongate, strongly compressed antero-posteriorly.
- a*⁸. With a large tooth on the lower border of the movable digit of the mandibles; upper surface of the tarsi not carinate HADRURUS.¹
- b*⁸. Lower edge of the movable digit of the mandible unarmed; upper edge of the tarsi carinate BRACHISTOSTERNUS, nov.

Genus ISOMETRUS (*Hemp. & Ehrb.*).1. ISOMETRUS MACULATUS (*De Geer*).

This small and slender Scorpion, which is widely distributed throughout the tropical and subtropical countries of the Old and New Worlds, is perhaps the best known species of the Order.

The British Museum has examples from the following West-Indian Islands:—St. Domingo; Jamaica; St. Thomas; St. Croix (*A. Newton*); Barbados (*H. W. Feilden*); Union Island, Grenada (*H. H. Smith*); and Trinidad (*W. E. Broadway*).

Genus TITYUS, *C. Koch*.

Tityus, *C. Koch*, *Die Arachn.* iii. p. 33 (1836).

Isometrus, *Thorell*, *Etudes Scorp. p.* 83 (1876); *Karsch*, *Mitth. Münch. ent. Ver.* p. 18 (1879); *Pocock*, *Proc. Zool. Soc.* 1890, p. 119.

Phassus, *Thorell*, *ibid.*; *Kraepelin*, *Jahrb. Hamb. Wissen. Anst.* p. 17 (1891).

Androcottus, *Karsch*, *op. cit.* p. 11.

This genus was established by C. Koch in 1836 upon *Scorpio bahiensis* of Perty. This species is clearly therefore the type of the genus, and if such species as *bahiensis* and its allies be considered generically distinct from *Isometrus maculatus*, the name *Tityus* must be retained for them. As I have elsewhere pointed out, I cannot see that Dr. Thorell was justified in selecting the South-African species *lineatus* as the type of *Tityus*, especially as Peters, who was the first to give an intelligible revision of the Scorpions, had previously characterized these South-African forms as his genus *Uroplectes*.

In my revision of the genera of the *Buthidæ*, published in the *Proc. Zool. Soc.* 1890, pp. 114–127, I followed Dr. Thorell and Karsch in considering the species of the *bahiensis* group as congeneric with the *maculatus* group. Prof. Kraepelin, however, has subsequently, and I think rightly, separated the former as a distinct genus, for which he selected Thorell's name *Phassus*. *Tityus*, however, has the priority, and I have consequently restored this old genus of Koch's.

Synopsis of the Species of Tityus.

- a.* The inferior keels of some of the caudal segments united *androcottoides*, Karsch.
- b.* The inferior caudal keels not united.
- a*¹. A spiniform tooth beneath the aculeus of the vesicle.
- a*². Less than 50 mm. in length; flavo-maculate *melanostictus*, nov.
- b*². Adult over 50 mm. in length; not flavo-maculate *americanus* (L.).
- b*¹. A small tubercle only beneath the aculeus of the vesicle.
- a*³. Entirely fuscous, of very large size, 23 pectinal teeth *insignis*, Pocock.
- b*³. Flavour, variegated with fuscous, smaller.
- a*⁴. Caudal keels denticulate, the upper edges of the 5th segment sharp and carinate; pectinal teeth 17.
- a*⁵. With 12 rows of denticles on the digits of the chelæ, the movable digit short, the hand-back two-thirds of its length *obtusus*, Karsch.
- b*⁵. With 14 rows of teeth on the movable digit, which is almost three times the length of the hand-back *antillanus*, Thor.
- b*⁴. Caudal keels granular, the upper edges of the 5th not carinate; pectinal teeth 18-22.
- a*⁶. Tail slender, the vesicle almost as wide as the 5th segment..... *pictus*, nov.
- b*⁶. Tail robust, the vesicle much narrower than the 5th segment ... *Smithii*, nov.

2. TITYUS ANDROCOTTOIDES (*Karsch*). (Pl. XXIX. figs. 3-3 b.)

Isometrus americanus, var. *androcottoides*, *Karsch*, *Mitth. Münch. ent. Ver.* 1879, p. 113.

Isometrus androcottoides, *Pocock*, *Ann. Mag. N. Hist.* (6) iv. p. 57.

The British Museum has received very many examples of this species from Trinidad (*Messrs. Hart and Broadway*). It is common in British Guiana (*Brit. Mus., W. L. Slater*).

Although Dr. Karsch looked upon this Scorpion merely as a variety of *T. americanus*—an opinion in which he has been followed by Prof. Kraepelin—I think there can be little doubt of its distinctness. When first I put forward this suggestion, I had only seen a few examples of the form to which the name *androcottoides* would apply; but during the past three years the British Museum has received many others, all of which justify the belief in the distinctness of *androcottoides* from *americanus*.

Apart from sexual characters which are very distinctive, this species may be recognized from *americanus*, as from all the Antillean species of the genus, by the fusion of the inferior keels of the posterior caudal segments.

3. TITYUS AMERICANUS (Linn.). (Pl. XXIX. figs. 2, 2 b.)

Scorpio americanus, Linn. *Mus. Adolph. Frid.* p. 84 (1754).

Scorpio europæus, Linn. *Syst. Nat.* ed. 10, p. 625 (1758); *De Geer*, *Mém.* vii. p. 344, pl. xli. figs. 5-8, ♀.

Scorpio obscurus, Gervais, *Arch. Mus.* iv. p. 219, ♀.

Scorpio forcipula, *id. loc. cit.* p. 221, pl. xi. fig. 26, ♂.

Isometrus americanus, Thorell, *Etudes Scorpiologiques in Atti Soc. Ital.* xix. p. 90; Bertkau, *Mém. Ac. Belg.* xliii. p. 7; Karsch, *Mitth. Münch. ent. Ver.* 1879, p. 113; Pocock, *Ann. Nat. Hist.* (6) iv. 1889, p. 57.

Phassus americanus, Kraepelin, *Jahrb. Hamb. Wissen. Anstalten*, viii. p. 112 (1891) (at least in part.)

This species, which is widely distributed throughout the northern parts of South America, occurs in Hayti and Porto Rico (*teste* Kraepelin and *Mus. Brit.*).

Note.—At present, in spite of the opinions of some of my contemporaries, I decline to admit the species named *T. æthiops* and *T. longimanus* of C. Koch (*Die Arachn.* xi. pp. 856-857) amongst the synonyms of *T. americanus*. My reasons are briefly these:—(1) C. Koch records the specimens of these species from Java, where *T. americanus* can only accidentally occur; (2) these two so-called species are clearly to me sexes of one and the same form, which must be called *æthiops*, and their sexual characters are not those of *T. americanus*.

4. *TITYUS INSIGNIS* (Pocock). (Pl. XXIX. figs. 1-1 a.)

Isometrus insignis, Pocock, *Ann. Nat. Hist.* (6) iv. p. 57 (1889).

Locality. Fond de Jacques in St. Lucia, collected by G. A. Ramage, Esq.

This species is the largest of the genus, since it attains a length of 110 mm. It is closely allied to *T. americanus*, but may be at once recognized by the presence of only a minute tubercle beneath the aculeus; the aculeus, too, is only lightly curved as compared with that of *T. americanus*. The male is unknown.

5. *TITYUS OBTUSUS* (Karsch). (Pl. XXX. figs. 10-10 a.)

Isometrus obtusus, Karsch, *Mitth. Münch. ent. Ver.* 1879, p. 117, ♀.

? *Isometrus antillanus*, Thorell, *Etudes Scorpiol.* p. 60, ♀ (cf. *infra*).

♂. *Colour* (dry) ochraceous, variegated with black. Cephalothorax ochraceous, the anteoocular area and tubercle fuscous, the fuscous patch with a flavous spot just in front of the tubercle, the posterior keels also fuscous, with a fuscous spot on the posterior margin outside the keel; tergites ochraceous, very indistinctly fusco-maculate; the lower surface of the trunk ochraceous, concolorous; tail with its anterior three segments uniformly ochraceous above, variegated with fuscous below, the fuscous colouring increasing posteriorly, the fourth and fifth segments and vesicle brunneo-fuscous above and below, deeper below; aculeus ferruginous, with black tip; palpi fusco-maculate above, the manus distinctly fusco-variegated externally, digits black, with ferruginous tips; legs with femora and tibiæ fusco-maculate; tarsi pale.

Trunk above granular; the anteoocular and posterior keels of the carapace coarsely granular, the median keel of the tergites feebly granular; fourth and fifth *sternites* finely granular; keels of the latter conspicuous and more coarsely granular.

Tail more than six times the length of the carapace, expanding from the base to the middle of the fifth segment; the upper surface of the segments somewhat deeply excavated, the first with 10 keels, the second to the fourth with 8, the median lateral of the second complete only posteriorly, all the keels well expressed and coarsely granular, the superior especially strong and denticulate; the intercarinal spaces at the base of the tail nearly smooth, but becoming gradually more and more granular towards the posterior end; the granules of the upper surface of the

fourth subserially arranged, the sides and lower surface of the fourth and fifth coarsely and closely granular throughout, the upper surface of the fifth also granular, smooth only in the middle and at its anterior end; vesicle granular laterally and below, distinctly denticulate on each side in front; a distinct tubercle beneath the aculeus. Upper surface of palpi normally granular and costate; *manus* large, wide and long, finely granular above, with granular costæ, its width about half the length of the movable digit, the length of the hand-back about two-thirds the length of this digit; digits sinuate at the base, lobate internally, and not in contact when closed, with about 12 rows of denticles.

Pectines with 17 teeth.

Length 60 mm.; length of carapace 6·3, of tail 41, width of 1st segment 3·2, of 5th 4, of vesicle 3, length of 1st 5·5, of 5th 7·5; length of brachium 7, width 2·2; length of "hand-back" 5, width of hand 3·5, length of movable digit 7·5.

Locality. San Domingo (*Mus. Brit.*); Porto Rico (*Mus. Berol.*).

The above description is taken from a single male example from San Domingo, in the collection of the British Museum. The female is unknown to me, but Dr. Karsch's description of examples of this sex in the Berlin Museum from Porto Rico, although unsatisfactory in many points, seems to apply to individuals which differ from the one from San Domingo in characters which by analogy are merely of sexual importance. Thus in the female the *manus* is not wider than the brachium, with the movable digit only slightly lobate; the *pectines* are basally lobate, and the tail is shorter, its fifth segment being only equal to the carapace in length. Moreover, Dr. Karsch makes no mention of the gradual expansion of tail from the base to the fifth segment.

It may thus be seen that the sexual features of *T. obtusus* are practically the same as those of *T. americanus*. Nevertheless Prof. Kraepelin undoubtedly fell into error in believing the two species to be synonymous. Apart from the marked difference between them in size and colouring, *T. americanus* being considerably larger and of a nearly uniform dark tint, the latter species has a large spiniform tooth beneath the aculeus of the caudal vesicle, and the intercarinal spaces of the tail not closely and coarsely granular.

6. *TIFYUS MELANOSTICTUS*, sp. n. (Pl. XXIX. figs. 4-4b.)

Colour flavous or fulvous, fusco-maculate, the ocular tubercle and anteocular portion of carapace fuscous, mesially flavous, the posterior and lateral portions of this plate fusco-maculate and lineate; each of the tergites, except the last, furnished in front with a transverse row of fine fuscous spots, the external spot on each side is situated on the very margin of the plates, the median one is divided by a flavous spot marking the median keel; posteriorly the tergites are adorned with three fuscous spots, the median of which is divided, like the spot in front of it, by a clear flavous spot, and the two lateral ones are united by a fine fuscous line, which marks the transverse granular ridge; the last abdominal segment, above and below, fusco-maculate; the rest of the sternites concolorous; the upper surface of the tail mostly concolorous, sometimes obscurely fusco-maculate, the lower surface of the first three segments mottled with flavous, the fourth and fifth segments and the vesicle generally uniformly infusate or reddish brown; palpi subfuscous, mottled with round clear flavous spots above, the digits fuscous at the base, becoming gradually pale distally; legs externally fusco-maculate.

♀. The *upper surface* of the body subtly granular, the normal keels not strong but visible; the *sterna*, except the last, smooth, marked with more or fewer large punctures; the last subtly granular with black keels. The *tail* about $5\frac{1}{2}$ times as long as the carapace, subtly granular, the keels visible but weak and subtly granular; the first segment with ten keels, the second with eight and a trace of the median lateral; the first segment a little wider than the fifth. The vesicle armed with an acute conical tooth beneath the aculeus.

The *palpi* with well-expressed granular keels, the intercarinal spaces coriaceous; the manus small, internally rounded and produced, normally costate, the costæ scarcely distinctly granular; its width considerably less than half the length of the movable digit and less than the width of the brachium. The *digits* long and slender, contiguous, neither lobate nor sinuate; the movable digit about twice the length of the "hand-back," and furnished with 14 rows of teeth.

The *pectines* shorter than the posterior coxæ, furnished with 15-17 (usually 16) teeth; the proximal lamella of the intermediate series produced internally into a rounded prominence.

♂. *Tail* parallel-sided, the fifth segment being equal to the first in width and a little more deeply excavated above, considerably smoother than in the female; the keels almost obsolete, about 6 times as long as the cephalothorax. The *manus* larger than in the female, the width about equal to half the length of the movable digit and much greater than the width of the brachium; the movable digit sinuate at the base with a distinct lobe, less than twice the length of the "hand-back;" the immovable also sinuate, so that when closed the two are separated at the base.

Pectines longer than in the female, just reaching the end of the 4th coxæ; the teeth longer than in the female, 17 in number.

Length of female 47 mm., of carapace 5, of tail 28, width of 1st segment 2·8, length of 5th 5·2, width of 5th segment 2·5, of vesicle 1·8; length of "hand-back" 2·7, of movable digit 6.

Length of male 43 mm., of carapace 4·3, of tail 26, width of tail 2·5, of vesicle 1·5, length of vesicle 1·8.

Locality. Trinidad.

This pretty little species seems to be tolerably common in Trinidad. The British Museum has received examples from Messrs. W. E. Broadway, J. H. Hart, R. L. Guppy, and Lady Broome.

7. *TITYUS PICTUS*, sp. n. (Pl. XXX. figs. 8-8 a.)

Colour very like that of *T. melanostictus*, but with the fuscous patches larger and imparting a darker aspect to the whole animal, the antecular fuscous patch generally entire, the 4th and 5th segments of the tail and the vesicle more deeply fuscous, and the dactyli entirely fuscous except their tips.

♀. The trunk more coarsely granular than in *T. melanostictus*, the keels better marked. *Tail* slender, rather more than $5\frac{1}{2}$ times the length of the carapace, the 1st segment a little wider than the 5th; all the segments more parallel than in *T. melanostictus*, the keels higher and more conspicuously granular; the vesicle much more robust than in *T. melanostictus*, with only a small tubercle beneath the aculeus. *Manus* of the palpi conspicuously keeled above, larger than in *T. melanostictus*, the width less than half the length of the movable digit; digits long and slender, the movable scarcely more than twice the length of the "hand-back," with 13 rows of teeth; the two digits contiguous, although lobate and sinuate proximally.

length of the two females is due to the fact that the trunk of the female of *T. pictus* is very much shrunken. The largest female of *T. Smithii* measures 63 mm. in length, the carapace being 6·5.

The pectinal teeth are the same as in *T. pictus*, varying from 18-21 in the female, and from 20-21 in the male.

Of this species I have seen three males and three females from Grenada, collected by R. V. Sherring, Esq.; and two males and two females from the Grenadines (Mustique and Bequia) obtained by H. H. Smith, Esq.

The examples from Mustique and Bequia differ from the others in having the tooth beneath the aculeus noticeably smaller, being merely a minute tubercle scarcely observable by the naked eye. Another difference, to which, however, analogy forbids one to attach much importance, is the greater width of the hand. Thus in a specimen from Grenada having the *brachium* 2·5 mm. in width, which is the same as in the male from Mustique Island, the *manus* is only just over 3 mm., while in the male from Mustique Island the *manus* is 4 mm. Curiously enough, too, in both the specimens from Mustique Island the movable digit has its distal third ferruginous, while in the Grenada form the digit is ferruginous only at the apex.

Since these characters also obtain in the specimens from Bequia, I propose to regard these Grenadine examples as representatives of a variety which may be called *microdon*.

9. *TITYUS ANTILLANUS (*Thorell*).

Isometrus antillanus, *Thorell*, *Etudes Scorpion.* pp. 60-62.

This species, described from a single female example from the Antilles, is unknown to me.

Prof. Kraepelin suggested that it might be one of the synonyms of *T. americanus*. It is, however, not *T. americanus* as recognized by me.

In colouring it approaches *T. obtusus*, *T. pictus*, and *T. Smithii*, being testaceous and marbled with black; it differs from them all, however, in having the vesicle flavous.

The carapace is subtly granular, but more coarsely anteriorly; the tergites, too, are subtly granular; the sternites are very subtly coriaceous.

Tail very nearly six times the length of the carapace, parallel-sided, the width of the first segment and fifth being equal; the keels are denticulate, and the superior lateral keels of the fifth are acute and bluntly denticulate; the intercarinal spaces

of the posterior segments are densely and coarsely granular; the *vesicle* ovate, sparsely granular, almost as wide as the fifth segment (2.5 mm. : 3), with a small thick tooth beneath the long aculeus.

Palpi with hands equal in width to the brachium; the movable digit a little less than twice the length of the hand-back, scarcely lobate, with 14 rows of teeth.

Pectines with 17 teeth.

Total length 53 mm., of carapace 5.7, of tail 34, width of tail 3, length of fifth segment 6.2.

Of the preceding species *T. antillanus*, in having the tail posteriorly coarsely and closely granular, its keels denticulate, and the superior lateral margins of the fifth segment sharp, approaches apparently most nearly to *T. obtusus* of Karsch, which it further resembles in having a wide caudal vesicle, a small tooth beneath the aculeus, and the same number of pectinal teeth. But never having seen the female of *T. obtusus*, I do not feel justified in making the two synonymous.

GENUS CENTRURUS (*Hempr. & Ehrb.*), *Thorell.*

Synopsis of the Species of Centrurus.

- a.* The 2nd and 3rd caudal segments furnished with 10 keels *princeps*, Karsch.
- b.* The 2nd and 3rd caudal segments furnished with only 8 keels.
- a*¹. A distinct spine beneath the aculeus of the poison-vesicle; the pectinal teeth on an average 30 (25-35).
- a*². With 9 rows of teeth on the digit of the palp; hand thinner, granulation finer, colour darker *gracilis* (Latr.).
- b*². With 8 rows of teeth on the digit of the palp; hand thicker, granulation coarser, colour redder *margaritatus* [(Gerv.).
- b*¹. With only a minute tubercle beneath the aculeus of the vesicle; pectinal teeth fewer than 25.
- a*³. Hand wider, its width in the adult more than half the length of the movable digit; tail smoother, shining *nitidus*, Thor.
- b*³. Hand narrower, its width about one third the length of the movable digit.
- a*⁴. Tail much thinner; trunk a uniform tint above and more coarsely granular *testaceus* (De Geer).

- b*⁴. Tail stouter; the trunk more finely granular, fuscous above, the tergites adorned with three yellow spots *insulanus*, Thor.

10. *CENTRURUS GRACILIS* (*Latr.*).

Scorpio australis, *De Geer, Mém. etc.* vii. p. 348, *teste Thorell*; not *australis* of Linn.

Scorpio gracilis, *Latr. Hist. Nat. Gén. Crust. et Ins.* vii. p. 127 (1804).

Androctonus biaculeatus, *Lucas in Webb & Berthelot's Hist. Nat. Canaries*, ii. pt. 3, p. 45; *Gervais, Ins. Apt.* iii. p. 54, pl. 23. fig. 3; *id. in Castelnau, Expéd. dans l'Amér. Sud, Scorpiones*, pl. ii. fig. 4.

Centrurus heterurus, *Karsch, Mith. Münch. ent. Ver.* 1879, p. 122 (at least in part).

This species is one of the commonest North Neotropical forms, being widely distributed in Central America and at least the northern parts of South America. It does not, however, appear to be common in the West Indies, since the British Museum has only one specimen from this region, and that is merely ticketed vaguely "Antilles."

The colour is usually a deep blackish green tinged with ferruginous, the legs and hands being especially liable to take on a clearer reddish colour.

The trunk is coarsely granular above. The tail is slender, posteriorly slenderer, about six times the length of the carapace in the female, and more than nine times in the male, there is a long spine close to the base of the aculeus. The palpi are slender, the manus being only a little wider than the brachium; the superior keel of the manus is strong, as a rule, and there are 9 rows of denticles on the digit. The pectines are furnished with an average of about 30 teeth (25-35).

11. *CENTRURUS MARGARITATUS* (*Gervais*).

Scorpio margaritatus, *Gervais, Voyage de la Bonite*, i. p. 281, *Atlas, Apt.* pl. i. figs. 13-17 (Paris, 1841); *id. Ins. Apt.* viii. p. 55 (1844).

Atræus Edwardsii, *Gervais, Arch. Mus.* iv. p. 216, pl. xi. figs. 13, 14 (1844); *id. Ins. Apt.* iii. p. 53; *id. in Castelnau, Expéd. dans l'Amér. Sud, Scorpiones*, pl. i. fig. 1.

Atræus De Geerii, *Gervais, Arch. Mus.* iv. p. 217, pl. xi. figs. 16, 17; *Ins. Apt.* iv. p. 54.

This species is common in Central America, Colombia, &c. It is evidently abundant in some parts of Jamaica, whence the British Museum has received many examples from Mr. Cockerell

and Mr. Peckham. We have no specimens, however, from any other West-Indian island.

There has been much unnecessary difficulty about the identity of this form, partly owing to confusion between it and the preceding species, *C. gracilis*. The two are in reality very easy to distinguish by the eye; but I believe the credit of first setting down their differential characters in tabular form belongs to Prof. Kraepelin. Strangely enough, however, this author seems to me to have gone hopelessly wrong about the names of the two; for he regards *Edwardsii* of Gervais as a synonym of *gracilis* (Latr.) (*biaculeatus*, Luc.), and what I have called *margaritatus* he terms *De Geerii*. But it seems clear to me that *De Geerii* is the same species as *Edwardsii*, although a different sex, and that both are synonymous with *margaritatus*. I strongly suspect that Prof. Kraepelin's mistakes are attributable to his ignorance of Gervais's original figures of *Edwardsii*, *margaritatus*, and *biaculeatus*. That Dr. Thorell failed to identify *margaritatus* is probably because Gervais's figure indicates that the crests upon the hands are granular. But this is probably pure imagination on the part of the artist, for the description merely says "*dessus de la main côtelé.*" Moreover, if *margaritatus* is to be excluded on account of its figure, so also must *Edwardsii*; for the artist has made the same exaggeration in the figure of the last-named species. Prof. Kraepelin, it seems likely, has been thrown off the scent with regard to *margaritatus* through not consulting Gervais's original description; for it is there asserted that the locality for the species is the Isle of Puna in the Gulf or River of Guayaquil, exactly one of the spots where the species might be expected to occur*. Gervais's statement in the 'Ins. Apt.' vol. iii., that the Island of Puna is in the Straits of Malacca is of course a mistake.

This species may be recognized from *C. gracilis* by being more coarsely granular, by having wider, more strongly crested hands, with shorter digits and fewer rows of teeth upon them. Moreover, as a very general, although not invariable, rule, the hands are darker than the rest of the palpi, and the digits are largely flavous, as also are the legs and the intercarinal spaces of the tail. In *gracilis* usually the hands are paler than the rest of the palpi, the digits fuscous, the whole animal being of a darker tint than *C. margaritatus*.

* I have seen examples of this species from Guayaquil, whence they were brought by Mr. Edward Whympfer.

12. *CENTRURUS INSULANUS*, *Thorell*. (Pl. XXX. figs. 12-12 b.)

Centrurus insulanus, *Thorell*, *op. cit.* p. 148; *Kraepelin*, *op. cit.* p. 127.

Colour pale fuscous above, the tergites adorned with three yellow bands, one median and one on each side; the upper surface of the tail and the lower surface of the trunk and appendages pale, but the lower surface of the tail and the external surface of the legs infuscate; palpi infuscate above, the manus pale internally; digits infuscate, with flavous tips.

♀. *Trunk* closely but not strongly granular above; smooth beneath and punctured, the third sternite being especially coarsely punctured in the middle of the hinder half. *Tail* about $5\frac{1}{2}$ times the length of the carapace, slightly narrowed posteriorly; the keels finely granular, the inferior ones stronger than the superior, the first four segments not twice as long as wide, the fifth just about twice as long as wide, its superior edges rounded; the intercarinal spaces very finely granular; *vesicle* ovate, with a minute tubercle beneath the aculeus but at some distance from its base.

Palpi moderate; manus a little wider than the brachium; the length of the "hand-back" more than half the length of the movable digit, the middle series of denticles on the digits consisting of 8 rows.

Pectines short, containing about 20 teeth.

Length 66 mm., of carapace 6·3, of tail 37; width of 1st segment 3·3, length 4·2; width of 5th 3, length 7.

Adult ♂. Longer and slenderer than female; the tail about $6\frac{1}{2}$ times the length of the carapace and parallel-sided, the segments, with the exception of the 1st, more than twice as long as wide.

Palpi slightly longer than in the female.

Length 71·5 mm., of carapace 7, of tail 47·5.

Locality. Jamaica; also, according to specimens in the British Museum, from Choco and Brazil.

The Museum has received many examples of this species from Mr. G. W. Peckham and Mr. T. D. A. Cockerell.

This species may be at once recognized from the preceding two by its finer granulation, difference in colour, absence of a spine beneath the aculeus, smaller number of pectinal teeth, &c.

13. *CENTRURUS TESTACEUS* (*De Geer*). (Pl. XXX. figs. 11–11 a.)

Scorpio testaceus, *De Geer*, *Mém.* vii. p. 347, pl. 41. fig. 11.

Centrurus testaceus, *Thorell*, *op. cit.* p. 160 ; *Kraepelin*, *op. cit.* p. 130.

♀. Colour a uniform testaceous or pale ochraceous throughout, the digits alone and the apex of the aculeus being lightly fuscous ; eyes black.

Trunk somewhat coarsely granular above ; anterior *sternites* of the abdomen shining, sparsely punctured, the 3rd not thickly punctured, the 4th coriaceous and subcostate, the 5th very finely granular, the keels well developed. *Tail* slender, slightly attenuated posteriorly, about six times the length of the carapace, the second segment twice as long as wide, all the intercarinal spaces finely granular, the keels well expressed and granular, the upper edges of the fifth not carinate ; the vesicle almost the same shape as in *C. insulanus*, but the aculeus sloped more backwards and the tubercle closer to its base. *Palpi* almost exactly as in *C. insulanus*, but perhaps rather longer, and with the keels on the manus a little more strongly expressed ; with 8 or 9 rows of denticles along the median series.

Pectines short, with about 20 teeth.

♂. Slenderer than female ; tail slightly attenuated posteriorly, about eight times the length of the carapace, the second segment about three times as long as wide, the vesicle elongate and ovate ; manus a little wider and distinctly longer than in the female. *Pectines* longer, with about 23 teeth.

Measurements in millimetres :—

♀. Total length 63, of carapace 6·3, of tail 37·5 ; width of 1st segment 2·8, length 4·8 ; width of 5th 2·5, length 7.

♂. Total length 64, of carapace 5·5, of tail 44 ; length of 1st segment 5, width 2·3 ; length of 2nd 6·6, width 2·2 ; length of 5th 8·8, width 2·2.

Locality. Montserrat (West Indies) ; presented by Sir A. Alderley.

This species has hitherto been known only from the West Indies ; this is, I believe, the first occasion on which a definite locality has been assigned to it.

This species resembles *C. insulanus* in possessing only a minute tubercle beneath the aculeus, and in having only about 20 pectinal teeth ; it is, however, more coarsely granular, differently coloured, has a much slenderer tail (*cf.* measurements), a differently formed vesicle, &c.

14. *CENTRURUS NITIDUS*, *Thorell*. (Pl. XXIX. figs. 5-5 b.)

Centrurus nitidus, *Thorell*, *op. cit.* p. 152; *Kraepelin*, *op. cit.* p. 129.

Centrurus tenuis, *Thorell*, *op. cit.* p. 153.

Centrurus republicanus, *Karsch*, *op. cit.* p. 120.

Colour testaceous, carapace anteriorly infusate, a fuscous patch upon each side of the tergites; tail inferiorly infusate towards its distal end; digits fuscous, with pale tips.

♀. *Trunk* above granular, but not closely or coarsely, the posterior keels of the carapace low. *Tail* parallel-sided, about six times the length of the carapace, shining; the intercarinal spaces, except posteriorly on the inferior surface, smooth; the keels granular, except those on the lower surface of the 1st segment, which are almost smooth; the superior edges of the 5th rounded, this segment about twice as long as wide, much wider than the brachium, almost as wide as the hand; *vesicle* smooth, with a minute tubercle close to the base of the aculeus. *Palpi* moderate; hands wide, much wider than the brachium, obsoletely costate above; the digits short, the back of the hand a little more than two thirds their length.

Pectines short, furnished with 17 teeth.

♂. *Tail* from $7\frac{1}{2}$ to 8 times the length of the carapace, generally slightly expanded towards its distal end, in one specimen parallel-sided; the 5th segment usually about two and a half times as long as wide (in one example more than three times as long as wide), usually considerably wider than the brachium.

Measurements in millimetres:—

♀. Total length 51, of carapace 5, of tail 31; length of 5th segment 5·8, width almost 3; width of brachium 2, of manus just over 3; length of "hand-back" almost 4, of movable digit 5·2.

♂ *a* (largest). Total length 69, of carapace 6, of tail 49; width of 1st segment 3, of 5th 3·3, length of latter 8·6; width of brachium 2·5, of manus 3·5; length of hand-back 5, of movable digit 6·5.

♂ *b*. (smaller). Total length 61, of carapace 5, of tail 40; width of 1st and 5th segments 2·3, length of latter almost 8; width of brachium 2, of manus 2·5.

Locality. Hayti, whence the British Museum has specimens. It also occurs in Brazil.

Of the above examples one only is a female. This and three of the males agree closely with Thorell's description of *C. nitidus*; the other male, the one from Keyserling's collection, is inter-

mediate in character between Thorell's *nitidus* and his *tenuis*: consequently I do not hesitate to adopt the above synonymy, which Prof. Kraepelin was the first to establish.

This species agrees tolerably closely in most of its characters with *C. testaceus* and *C. insulanus*; it may, however, be at once recognized by its thicker hands and relatively shorter fingers.

15. *CENTRURUS PRINCEPS, *Karsch, op. cit.* p. 121; *Kraepelin, op. cit.* p. 139.

Locality. Port au Prince (Hayti).

This species is very likely referable to the following genus, *Heteroctenus*, to both of the known species of which it offers a great likeness.

It may be recognized from all the other known West-Indian species of *Centrurus* in having the median lateral keel complete on the 2nd and 3rd segments.

The following two are of doubtful position both generically and specifically:—

*TITYUS GRISEUS, *C. Koch, Die Arachniden*, xi. pp. 43-45.

This species, described from St. Thomas, may be either a *Centrurus* or a true *Tityus*. There is no apparent reason for supposing that it is *Scorpio griseus* of Fabricius.

*SCORPIO GRISEUS, *Fabr. Ent. Syst.* ii. p. 435, no. 7.

"*S. pectinibus vigintiquinque dentatis, manibus subciliatis ovatis.*

"*Habitat in Americæ Insulis.*

"*Corpus parvum, pallide testaceum, immaculatum. Manus subciliatæ, chelis ovatis, digitis fuscis. Cauda corporis longitudine, 6-articulata, ungue acutissimo.*"

HETEROCTENUS, gen. nov.

(ἕτερος, different; κρείς, κρεῖος, a comb.)

Resembles *Centrurus* (Ehrb.) in most respects.

Pectines, in both sexes, expanded at their proximal extremity owing to an increase in width of the intermediate lamellæ of the basal half of the organ. The sternal plate that supports the pectines large, with ovate posterior border. The following sternum that bears the first pair of stigmata marked on each side with a strong groove which rises from the inner end of the

stigma and passes obliquely inwards for half its length, then almost directly forwards to meet its fellow of the opposite side at the anterior edge of the sternum. The poison-vesicle without or with a spine beneath the sting.

In *Centrurus* the pectines are only gradually attenuate from the base to the apex; the sternum that supports them is an inconspicuous plate smaller than the genital operculum, and the sternum of the first somite that bears the stigmata is only furnished with two shallow depressions. Beneath the aculeus there is a spine or tubercle.

16. HETEROCTENUS JUNCEUS (*Herbst*).

Scorpio junceus, *Herbst*, *Nat. ungeflügelt. Insekten*, iv. p. 65, pl. 3. fig. 2.

Scorpio Hemprichii, *Gervais*, *Ins. Apt.* iii. p. 54; *id. Arch. Mus. Hist. Nat.* iv. p. 218, pl. xi. fig. 18; *id. in Castelnau, Expéd. dans l'Amér. du Sud*, vii. *Zool.* iii. p. 41, pl. i. fig. 2.

Rhopalurus Hemprichii, *Karsch*, *Mitth. Münch. ent. Ver.* 1879, p. 119.

Centrurus Hemprichii, *Kraepelin*, *Jahrb. Hamb. Wiss. Anst.* viii. p. 135.

♀. *Colour* ochraceous or castaneous; aculeus and digits fuscous, with fulvous tips; tail posteriorly infusate. *Carapace* coarsely and subserially granular. *Abdomen* also coarsely granular above, smooth but punctured beneath. *Tail* rather more than $5\frac{1}{2}$ times the length of the carapace, gradually expanded from the base to the middle of the 4th segment; the 5th in the middle almost as wide as the 4th, abruptly narrowed posteriorly; all the keels well developed, granular, the superior ones, except on the 5th segment, denticulate; the 1st segment with 10 keels, the 2nd, 3rd, and 4th with 8. *Vesicle* ovate, aculeus long. *Palpi* powerful; manus rounded, considerably wider than the brachium, obsoletely keeled; digits long, in contact, the movable about twice as long as the hand-back. *Pectines* short, with from 17–19 teeth.

Total length 105 mm., of carapace 12, of tail 65; width of 1st tail-segment 6·5, of 4th 7·5, of brachium 4·5, of manus 6; length of hand-back 7, of movable digit 14.

♂. Tail slightly longer than in female, being nearly six times the length of the carapace, and much more robust, expanded from the base to the middle of the 5th segment. Manus much wider than in the female; the digits strongly sinuate, and widely separated at the base. *Pectines* with from 18–23 teeth.

Total length 97 mm., of carapace 11, of tail 65·5; width of 1st segment 7, of 5th 9, of brachium 4, of manus 7.

Locality. Hayti (*Mus. Brit. etc.*).

According to other specimens in the British Museum collection, this species also exists in Mexico and Brazil.

Hitherto this form has been known by the specific name of *Hemprichii*. But *Sc. junceus* of Herbst appears to me to be the same Scorpion, and I have consequently adopted this name for it. Herbst's specimen was said to have only 16 pectinal teeth, a number which is somewhat below the average; but it does not seem that this character can be of any great value, seeing that within the limits of the eleven specimens known to me the number varies from 17-23.

In addition to the species recorded above, I refer to this genus a second, of which the British Museum possesses three specimens from Brazil. These specimens I, without hesitation, identify as *H. Agamemnon*, C. Koch (*Die Arachn. vi. p. 103, fig. 506*). *H. Agamemnon* differs from *H. junceus* in having an acute spine beneath the aculeus of the tail and in having the subpectinal area of the first sternite finely granular, &c.

Possibly also *Centrurus princeps* of Karsch is a *Heteroctenus* (*cf. supra*).

Genus DIPLOCENTRUS, *Peters, Mon. Ak. Wiss. Berlin, 1861,*
p. 512; *Thorell, Etudes Scorp. p. 10.*

Anterior border of carapace deeply excised in the middle; the ocular tubercle cleft and situated well in advance of the middle of the plate. Three lateral eyes on each side, almost on the very edge.

Tail moderately strong; vesicle with a distinct tooth beneath the aculeus, which is very short.

Palpi robust; hands large, convex, the denticles of the digits consisting of a close-set median series, on each side of which is a lateral series consisting of more scattered denticles, some of which are enlarged.

Chelicerae with the superior terminal fang much shorter than the inferior.

Terminal tarsal segment of the *legs* armed beneath with two parallel rows of spines.

Sternum pentagonal, about as wide as long, with parallel sides.

Genital operculum cleft in the male, its halves united in the female.

Pectines of normal construction.

Stigmata elongate.

17. *DIPLOCENTRUS GUNDLACHII, *Karsch, Zeits. Naturwissen.* (3) v. pp. 407-408 (1880).

This species has been very briefly described.

The upper surface of the trunk is entirely smooth. The dorsal surface of the head is evenly arched, and nearly smooth. The first four segments of the tail have 10 complete keels.

Pectinal teeth 6-8.

Length 30-32 millim.

Locality. Trinidad and Cuba.

18. DIPLOCENTRUS ANTILLANUS, sp. n. (Pl. XXIX. figs. 6-6a.)

♀. *Colour* fusco-castaneous above; legs and vesicle ferruginous, lower surface of trunk ochraceous; rarely (in smaller specimens) the upper surface is paler and obscurely variegated with fuscous. Smooth and polished.

Carapace smooth, very finely and closely punctulate, at most obsoletely granular at the sides; the tubercle small, undivided, the area in front and behind it deeply sulcate longitudinally; the anterior border deeply emarginate in the middle, the frontal lobes rounded.

Tergites smooth, finely punctulate, minutely granular only posteriorly; the last, however, more coarsely granular at the sides, some of the granules on each side arranged in two series, so that the tergite may be said to be furnished with four keels.

Sternites smooth, finely punctulate, and studded with a few larger punctures, two of which are symmetrically placed near the middle on each side of the central line; a distinct longitudinal depression on the inner side of each of the stigmata; the last sternite more distinctly punctulate and obsoletely quadricostate posteriorly.

Tail about four times the length of the carapace, which is a little shorter than the first two segments, tolerably deeply and widely excavated above, finely punctulate; the keels all well-developed but not granular, at most crenulate, but impressed with setiferous pores which give them a roughened appearance; the first and second segments furnished with 10 keels; the median lateral keel, however, of the second weaker than the

others, the third segment with 8 keels and a trace of the median lateral; the superior lateral keel of the first four segments strong in front and terminating in a rounded lobe; the upper edges of the fifth segment squared not elevated; the inferior keels finely denticulated, a smooth crescentic area at the hinder end of its lower surface; *vesicle* studded beneath with setiferous pores, the conical spine beneath the aculeus thickly hairy; aculeus about half the length of the vesicle, gently curved.

Palpi punctulate above; the *humerus* granular at the base, with irregularly granular superior keels, finely granular in front also; *brachium* studded posteriorly with setiferous pores, the supero-anterior keel at most crenulate, the anterior surface smooth except for a vertical series of three fine denticles above at the base. *Manus* large, more than twice the width of the brachium, widely and evenly rounded internally, convex above, and obsoletely tricostate, the lower surface also obsoletely tricostate; the "hand-back" furnished with a single keel which runs obliquely backwards and upwards from above the lower articular facet of the movable digit; *digits* slender, not lobate, the movable a little longer than the width of the hand.

Legs smooth, the lower surface of the feet furnished with two rows of spines.

Pectines short, with 8-9 teeth.

♂. Much less smooth than the female, the carapace so closely punctured as to be finely rugulose; the upper surface of the hand adorned with a reticulated pattern of minute granules, the external and internal keel of its upper surface very strong. *Tail* longer, about $4\frac{1}{3}$ times the length of the carapace, which is equal to the first caudal segment and $\frac{2}{3}$ of the second. The pectines much larger, both the shaft and the teeth being longer.

Measurements in millims.—♀. Total length 44, length of carapace 6, of tail 24, of its first two segments 6, of the fifth 5.2; length of brachium 4.8, width 2; width of hand 5; length of hand-back 4, of movable digit 6.

♂. Total length 46, length of carapace 6, of tail 27, of its first two segments 7, of the fifth 6, of brachium 5, of hand-back 4, of movable digit 6, width of hand 5.2.

Locality. St. Lucia (*G. A. Ramage*); St. Vincent (*H. H. Smith*).

Of the described species of *Diplocentrus* this new form seems to differ from *D. Gundlachii* in that the 1st segment of the tail is the only one that contains 10 complete keels.

From *D. Whitei*, Gervais, a Mexican form, it differs in being smaller, in having fewer pectinal teeth, the inferior caudal keels not granular, the last abdominal sternite not costate, and slightly also in the shape of the external surface of the hand.

From *D. mexicanus*, Peters, which is possibly the male of *D. Whitei*, it also differs in not having the first four caudal segments furnished with 10 keels.

19. *DIPLOCENTRUS SCABER*, sp. n.

♀. *Colour* fusco-ochraceous, palpi ferruginous.

Carapace finely granular throughout, the area between the tubercle and the anterior excision not mesially sulcate.

The *tergites* also finely granular throughout.

The last *sternite* with four distinct, granulate, abbreviated keels.

Tail about the same relative length as in *D. antillanus*, with the intercarinal spaces finely granular and the keels distinctly crenulate or granular; the four anterior segments furnished with 10 keels each.

The palpi resembling those of *D. antillanus* in form; but the "hand-back" bounded by two distinct smooth keels, one starting from the upper and the other from the lower articular facet of the movable digit and passing backwards to the posterior border of the external surface of the hand.

Legs externally minutely granular.

Pectines short, furnished with 6 teeth.

Total length 34.5 millim., of carapace 4.3, of tail 17.5; width of 1st segment almost 3, length 2.

Locality. Jamaica (*P. H. Gosse*) and Barbados.

This species appears to resemble *D. mexicanus* of Peters (Mon. Ak. Wiss. Berl. 1861, p. 512) in having the dorsal surface granular and two keels on the back of the hand (*cf.* Karsch, Mitth. Münch. ent. Ver. 1879, p. 99). *D. mexicanus*, however, at least differs in being considerably larger (50–55 millim.), and in having a greater number of pectinal teeth (12 or more) (*cf.* Karsch, Zeits. Naturwissen. (3) v. p. 407, 1880).

Genus *OICLUS*, *Simon, Ann. Soc. Ent. Fr.* (5) x. pp. 397–398 (1880).

According to Simon this genus differs from *Diplocentrus* in

having the anterior border of the carapace lightly emarginate and only two lateral eyes on each side of it.

Type *O. Purvesii*, Becker.

20. * *OICLUS PURVESII* (*Becker*).

Diplocentrus Purvesii, *Becker, Ann. Soc. Ent. Belg.* xxiv. p. 142, pl. iii. fig. 2 (1880).

Oiclus Purvesii, *Simon, Ann. Soc. Ent. Fr.* (5) x. pp. 397-398 (1880).

"Carapace elongate, granular on each side of the middle line and posteriorly at the sides.

"Tergites with three rows of tubercles, the posterior row along the hinder border.

"Tail four times as long as the carapace, with granular keels; vesicle elongate.

"Hands short, robust, granular above.

"Pectines with 7 teeth."

Locality. "Antigua."

Genus *OPISTHACANTHUS*, *Peters, Mon. Ak. Wiss. Berlin*, 1861, p. 511; *Thorell, Etudes Scorp. p.* 10.

Carapace deeply excised anteriorly, longitudinally sulcate throughout. Ocular tubercle near the middle. Three lateral eyes on each side.

Tail compressed, and rather short; vesicle without spine beneath the aculeus, which is short.

Chelicerae with superior terminal fang subequal to the inferior.

Palpi large, denticles of the digits almost as in *Diplocentrus*; the upper surface of the hand divided by a strong keel into two areas, the external of which is nearly vertical and meets the internal horizontal area at an obtuse or right angle, the vertical area separated by a strong keel from the "hand-back," which constitutes the external area of the lower surface of the hand.

Terminal tarsal segment of the legs furnished beneath with two rows of spines.

Sternum pentagonal, as wide as long, parallel-sided.

Genital operculum cleft in the male, its halves united in female.

Pectines short, the shaft very broad at the base owing to the width of the basal intermediate lamella.

Stigmata elongate.

Type, *O. elatus*, Gervais.

21. *OPISTHACANTHUS ELATUS* (*Gervais*).

? *Scorpio lepturus*, *Pal. de Beauvois, Insectes etc.* p. 191, *Apt.* pl. v. fig. 4.

Scorpio elatus, *Gervais, Arch. Mus.* iv. p. 235, pl. xii. figs. 46-49; *id. Ins. Apt.* p. 69.

Opisthacanthus Kinbergii, *Thorell, op. cit.* p. 172.

Carapace somewhat flat, wider than long; granular throughout; median eyes large, scarcely elevated on a tubercle; lateral eyes very prominent, the distance between the anterior and median twice as great as between the median and posterior, which are subcontiguous.

Tergites granular and rugose, the last not carinate, but furnished posteriorly with two small tubercles.

Sterna smooth, the last subcostate.

Tail $2\frac{1}{2}$ times the length of the carapace, which is as long as the first two segments and more than half the third, narrowed posteriorly; the segments mesially excavated above, with rounded smooth edges, subcarinate beneath but granular only posteriorly; vesicle smooth, with long hairs beneath the aculeus.

Palpus: *humerus* denticulate in front and behind, the upper surface smooth distally; *brachium* with a strong denticulated crest at the proximal end of its anterior surface; *manus* coarsely granular above, rugose beneath, denticulate in front; the "hand-back" about as long as the movable digit, the width of the hand about $\frac{2}{3}$ the length of the "hand-back"; the digits scarcely sinuate, and lobate at the base.

Legs with femora granular beneath.

Genital operculum heart-shaped, pointed posteriorly, nearly as long as wide, without trace of suture.

Pectines very small, only a little longer than the width of the operculum, furnished with 7 teeth.

♂. *Tail* a little more than three times the length of the carapace. *Digits* correspondingly lobate and sinuate. *Genital operculum* rounded, and not pointed behind. *Pectines* much larger, and furnished with 12 teeth.

Measurements in millims. of adult male.—Total length 87, of carapace 13, of tail 41, of "hand-back" 15, width of hand 11.

Locality. Hayti, according to specimens in the British Museum. It also occurs in Colombia.

Genus BROTEOCHACTAS, *Pocock*,

Ann. Mag. Nat. Hist. (6) xii. pl. v. figs. 2, 3.

Anterior border of carapace very lightly depressed in the middle, but not excised. The lateral eyes two in number; the anterior close to the margin of the carapace, the posterior a little above it, not or but little prominent. The tubercle of the median eyes far in front of the middle of the carapace.

Sternum wider than long, of the pentagonal type; its posterior border widely emarginate, equalling in width the maxillary lobes of the second coxæ.

Pectines short.

Stigmata oval.

The movable digit of the *chelicerae* not terminating in two subequal fangs, the upper one being short.

Palpi short, robust.

Tail robust, anteriorly smooth beneath.

Lower surface of the terminal tarsal segment of the legs ornamented with spiniform hairs, which are arranged more or less distinctly in two series.

Differs from *Chactas* in that the front of the carapace is not emarginate, the lateral eyes not prominent, the lower surface of the feet not compressed and not armed with a single series of spines, &c.

22. BROTEOCHACTAS NITIDUS, *Pocock*. (Pl. XXIX. figs. 7-7a.)

♀. *Colour* castaneous; legs, vesicle, and lower surface a little paler.

Carapace perfectly smooth and polished, marked with a Y-shaped groove, the two upper arms of which embrace the ocular tubercle; the anteocular portion not mesially depressed, the lateral portion sloped away.

Tergites perfectly smooth and polished, marked in front on each side of the middle with a shallow depression; the last tergite with four tubercles (sometimes six) corresponding to the four superior keels of the tail-segments.

Sterna smooth and polished.

Tail robust, narrowed towards its distal end, the upper surface smooth and polished, the first segment scarcely excavated longitudinally, the excavation increasing in depth to the fourth, the fifth flat posteriorly, excavated in front, the supero-lateral keels

well developed on the four anterior segments, shining but obsoletely crenulate; the superior keels represented by a single posterior tubercle on the first segment, visible on the others and obsoletely tuberculate or crenulate, the upper angles of the fifth not sharp but squared; the lateral and inferior surfaces of the first three segments smooth and polished, sparsely hairy, not keeled; of the fourth obsoletely keeled and granular, the lower surface of the fifth somewhat coarsely but irregularly granular, its posterior border denticulate. *Vesicle* piriform, coriaceous beneath, smooth and flat above, the aculeus stout at the base, somewhat strongly but evenly curved in its distal half.

Palpi robust; *humerus* with its keels weak but granular, its anterior surface flat, weakly granular; *brachium* smooth, obsoletely costate; *manus* large, convex above, its inner portion produced, smooth, obscurely and very feebly granular towards its inner edge, and very obscurely costate above, its width about equal to the length of the "hand-back," which is furnished with an oblique row of four piliferous pores. Digits short, curved, in contact, the movable a little longer than the length of the "hand-back," the immovable furnished with five piliferous pores; four more of these pores in a line on the external surface of the hand, lying between the bases of the two digits.

Legs smooth, except the inferior edge of the anterior two femora, which are granular; the distal tarsal segment with two rows of hairs beneath.

Pectines short, furnished with 7 teeth (one specimen with 8).

♂. Slenderer than female, the tail longer, being about $4\frac{1}{2}$ times the length of the carapace. The upper surface of the hand very finely granular. *Pectines* larger, the teeth much longer, 8 in number.

Measurements in millims.—♀. Total length 38, of carapace 5, of tail 20; width of 1st caudal segment 3, length 2; length of 4th segment 3, width 2.5; length of 5th 5.5, width 2.5; length of palp 15.5; width of brachium 1.8, of manus 4, of "hand-back" 3.8, of movable digit 4.5.

♂. Total length 31, of carapace 4, of tail 19.

Locality. Trinidad (*W. E. Broadway* and *J. H. Hart*).

This species is very nearly related to *Chactas Gollmeri*, Karsch, from Caraccas, which probably also belongs to the same genus. Karsch, however, makes no mention of the presence of keels and granules upon the lower surface of the 4th caudal segment. Nor

in *Broteochactas nitidus* is the manus marked with many ocelliform punctures arranged in three rows.

I also refer to this genus *Chactas delicatus*, Karsch, of which the British Museum has a large number of specimens from Demerara (British Guiana), a few ticketed S. America, and one from Colombia. The variety named *opacus* by Karsch is nothing but the male of *delicatus*.

Genus HADRURUS, Thorell, *Etudes Scorpionol.* p. 9.

Carapace very closely resembling that of *Brachistosternus*, the lateral eyes a little larger and a little farther from the edge.

The digits of the *chelicerae* shorter than in *Brachistosternus*, and the teeth more robust; the terminal fang of the movable digit shorter; a large tusk on the lower border of this digit.

Digits of the chelæ denticulate as in *Brachistosternus*, but the denticles of the median series more numerous.

Tail as in *Brachistosternus*.

Sternum almost as in *Brachistosternus*, but larger and not entirely tucked in as in this genus. The genital operculum small, not in contact with the second pair of coxæ, cleft in both sexes.

Pectines long, with their intermediate lamellæ formed of a single series of rounded sclerites.

Legs as in *Brachistosternus*, but the terminal tarsal segments not carinate above.

Type, *H. hirsutus* (Wood).

23. *HADRURUS PARVULUS, Karsch, *Mitth. Münch. ent. Ver.* 1879, p. 135.

“Very like *H. maculatus* of Thorell. Of smaller size. Colour testaceous, with longitudinal fuscous striæ on the upper surface of the abdomen.

“*Carapace* finely, abdomen very finely granular; tail smooth and shining above, the first and second segments with a few larger tubercles at the sides; the first segment with a complete median lateral carina, this carina incomplete on the 2nd and 3rd; the inferior lateral keels of the 4th segment smooth, the median absent, marked by punctures. The rest as in *H. maculatus*. Pectinal teeth 17.

“Length 37 mm., tail 20.

“*Locality*. W. Indies.”

BRACHISTOSTERNUS, gen. nov.

Syn. Mecocentrus, Simon, *Ann. Soc. Ent. Fr.* (5) x. p. 393.

Carapace longitudinally sulcate throughout, the sulcus passing over the tubercle, the anterior border lightly convex; the ocular tubercle in the middle of the carapace; lateral eyes three in number, minute, contiguous, just above the lateral border. The terminal fang of the movable digit of the chelicerae long, the fang at its base very short.

Palpi moderately strong; the digits armed with several short, oblique series of denticles, the posterior denticles of each series enlarged to form an external series of larger denticles; a corresponding internal series of denticles alternating with the external series.

Tail moderately long; the aculeus of the vesicle long, slender, and lightly curved.

Stigmata elongate.

Sternum almost invisible, owing to its having taken up a vertical position behind the coxae of the second pair of walking-legs, distinctly of the pentagonal type, much wider than long, with its posterior border deeply emarginate.

The *genital operculum* very large, in contact with the coxae of the second pair of walking-legs, its two halves separate in both sexes.

Pectines long, the intermediate lamellae formed of two rows of sclerites.

Legs long, the terminal tarsal segment carinate above, shortly hairy below.

Type, *B. Ehrenbergii* (Gerv.).

This genus is certainly synonymous with Simon's *Mecocentrus* and possibly with Thorell's *Telegonus*. But I cannot bring myself to believe that it is the same as *Telegonus* of C. Koch. This genus *Telegonus*, which was renamed *Mecocentrus* by Karsch* on the grounds of the preoccupation of the name employed by Koch, was based upon a species *versicolor*†, which at least differs from *Brachistosternus* in the extreme thickness of its tail. A glance at the figure of *T. versicolor* shows that all the anterior caudal segments are considerably wider than long,

* Zeit. Naturwissen. (3) v. p. 408 (1880).

† Die Arachniden, iii. p. 52, fig. 207 (1836).

whereas one of the characters that Simon gives for *Mecocentrus* is the fact that the caudal segments are longer than wide.

24. BRACHISTOSTERNUS EHRENBERGII (*Gervais*).

Scorpio Ehrenbergii, *Gervais, Voyage de la Bonite*, i. p. 282, pl. i. figs. 18-22; *id. Ins. Apt.* iii. p. 59, ♂.

Scorpio glaber, *Gervais, Voyage de la Bonite*, i. p. 285, pl. i. figs. 28-32; *id. Ins. Apt.* iii. p. 59, ♀.

Telegonus politus, *L. Koch, Verh. z.-b. Wien*, xvii. pp. 234, 235 (1867).

♀. *Colour* ochraceous, the tergites infuscate, the aculeus of the vesicle and the digits also infuscate.

Carapace smooth above, closely and finely granular at the sides, equalling in length the 5th caudal segment and the 1st + $\frac{1}{3}$ of the 2nd.

Tergites very finely granular, with a median depression, the last much more coarsely granular, with a single granular keel. *Sternites* perfectly smooth.

Tail rather more than five times the length of the carapace, narrowed posteriorly, the upper surface only shallowly excavated; the lower surface of segments 1-4 entirely smooth beneath, being merely obsoletely subcarinate and symmetrically porous; the superior keels stronger, subgranular or crenulate, the granulation decreasing posteriorly; the 5th segment about twice as wide as long, the superior edges not carinate, very lightly crenulate, the upper surface entirely smooth, lightly depressed mesially, the lower surface finely granular, the three inferior keels strong and denticulate. Vesicle piriform, narrower than the 5th, a little wider than high; the aculeus long and very lightly curved.

Palpi: humerus smooth or nearly so in the intercarinal spaces, the keels granular; *brachium* smooth and not keeled posteriorly, weakly granular in front; *manus* round and smooth.

Legs with femora externally very finely granular.

Pectines with 32-33 teeth, overlapping the end of the coxæ by half the length of the distal sclerite of the shaft.

♂. More closely and coarsely granular than the female; the sternites distinctly coriaceous; the tail six times the length of the carapace, which is as long as the 1st and $\frac{1}{5}$ of the 2nd segment, and also more robust than in the female, with two elongate pale spots on the upper surface of the 5th segment. *Hands* of the palpi more robust, with a conspicuous triangular tooth on its inner surface in front. *Pectines* longer, reaching almost to the extremity of the trochanter of the posterior legs.

Measurements in millims.—♀. Total length 77, of carapace 7·8, of tail 4·3; width of 1st segment 4·5, of 5th 3·8; width of brachium 2·5, of manus 3·6; length of hand-back 5, of movable digit 6·6.

♂. Total length 81, length of carapace 8, of tail 5·3; width of 1st segment 5·8, of 5th 4·8, length of 5th 9·8; width of brachium 3, of manus 5·5; length of hand-back 7, of movable digit 8.

Locality. W. Indies*.

The British Museum possesses a single female example of this species, ticketed W. Indies, and belonging originally to the collection of the late Count Keyserling. The description of the two sexes has been drawn up from two other examples in the British Museum from Lima, which are certainly to my mind co-specific with the specimens Gervais had from Peru. The Antillean example has 34 pectinal teeth. The original example described from Peru has about 40 teeth.

PEDIPALPI.

Very few species of this group have been recorded from the West Indies, as may be seen from the subjoined list, and neither of these are restricted in range to this area of the Neotropical Region.

Suborder UROPYGI.

Family THELYPHONIDÆ.

THELYPHONUS ANTILLANUS, C. Koch, *Die Arachniden*, x. p. 29, fig. 773.

Locality. Hayti.

Of this genus no species have as yet been discovered in the Lesser Antilles. The only one known from the West Indies is the above, which seems to be not uncommon in Hayti.

Suborder AMBLYPYGI.

Family TARANTULIDÆ.

TARANTULA RENIFORMIS (Linn.).

Phalangium reniforme, Linn. *Syst. Nat.* ed. 10, p. 619.

* This locality certainly needs confirmation.

Tarantula reniforme, *Fabr. Ent. Syst.* ii. p. 432.

? *Phalangium reniforme*, *Licht. & Herbst, Natursyst. ungeflüg. Insekten*, p. 79, pl. v. fig. 1 (not pl. vi. K.)

? *Phalangium palmatum*, *id. ibid.* p. 82, pl. iv. fig. 2.

Phrynus margine-maculatus, *Koch, Die Arachn.* viii. p. 6, fig. 597.

Phrynus palmatus, *id. ibid.* p. 13, fig. 601.

Phrynus pumilio, *id. ibid.* p. 15, fig. 602.

Phrynus reniformis, *variegatus*, *palmatus*, *fuscimanus*, *Butler, Ann. N. Hist.* (4) xii. pp. 118, 119.

Phrynus Goesii, *Thorell, Ann. Mus. Gen.* (2) vii. p. 530.

Not Syn. *Phalangium reniforme*, *Pallas, Spic. Zool.* i. pt. ix. pp. 34, 35, pl. iii. figs. 3, 4.

Tarantula reniformis, *Simon, Ann. Soc. Ent. Fr.* 1892, p. 51.

Colour. Carapace reddish brown or almost black, with some faintly indicated lateral marginal flavous spots and some fine stripes of the same colour radiating from the fovea externally and posteriorly; upper surface of the abdomen in well coloured specimens ornamented with black or deep brown and reddish or flavous spots, the spots alternating like the pattern of a chess-board, each tergite bearing 10 spots, 5 anterior and 5 posterior, the anterior row consisting of 3 black and 2 yellow spots and the posterior of 2 black and 3 yellow spots; palpi the same colour as the carapace; legs ferruginous or fuscous, with a faintly defined flavous spot on the external surface of the femur. Lower surface ferruginous or fulvous.

Carapace coarsely but not closely granular, its anterior border lightly emarginate and conspicuously dentate, the rest of the border denticulate.

The upper surface of the *abdomen* granular like the carapace.

Palpi rather short, but varying in length from about three times the length of the carapace to only a little more than twice the length; the brachium a little longer than the humerus, longer than the length of the carapace but shorter than its width. The *humerus* granular above and below, more weakly granular in front, its upper edge armed in its proximal half with from 5 to 6 (8) larger spines and some smaller ones; the second and third are the largest and the first rises from the base of the second; its inferior edge armed with about 8 larger and smaller spines, of which the first and second are considerably the largest. *Brachium* granular like the humerus, its upper edge armed in its distal half with 7 spines, of which the first and seventh are the

smallest, the rest are very long, but the fourth and sixth are a little shorter than the rest; its lower edge armed with 2 long and 3 or 4 shorter spines. *Manus* armed above with 3 spines, of which the second is much the longest, and some spinules; its lower edge armed with 1 long spine in the middle and 1 very much shorter one in front and behind it.

Legs thickly granular.

Measurements of largest specimen:—

Total length 34 mm., length of carapace along the middle line 12, its greatest length 14, width 19; length of abdomen 22, of humerus 15, of brachium 16.5, of manus and dactylus 13.

This species is very widely distributed in the northern parts of the Neotropical Region. The British Museum has examples from the following West Indian islands:—Cuba, Jamaica, Hayti, Bahamas, Montserrat, Martinique, Dominica (*Nicholls*), St. Lucia (*Ramaye*), St. Vincent (*H. H. Smith*), Barbados (*H. W. Feilden*), and Trinidad. It has also been recorded from Porto Rico (*Karsch*), St. Bartholomew (*Thorell*), and Antigua (*Brown*).

In his recent revision of this family, M. Simon characterizes the genus *Tarantula*, of which *reniformis* (Linn.) is the type; but it seems to me certain that he has fallen into error in his identification of *reniformis* of Linn., and also in his diagnosis of the genus.

He states that Linnæus's description of *reniformis* can be applied to all the species of the family Tarantulidæ, and that Linnæus himself assigns the New World as its locality; consequently it is permissible to suppose that *reniformis* is the species which most often comes to us from Tropical America.

But Linnæus was very much more precise in this matter than M. Simon makes out; for in the tenth edition of the 'Systema' it is expressly stated that the description of *reniformis* is based upon the figure and description of a *Tarantula* published in Brown's 'History of Jamaica,' and this island is mentioned as the home of the species. As a matter of fact, upon this latter point Linnæus asserted more than he had warrant for; for Brown remarks that he had never seen the species in Jamaica, although it occurred in several of the West Indian Islands (Sugar Islands); his figure, he adds, was taken from a specimen from Antigua, which was lent to him by a friend. Now this figure, with its robust and short palpi, clearly represents the species that I have

characterized above as *reniformis*; and that it is the *reniformis* of Linnæus no one, I think, can dispute.

Moreover, I may mention that of all the Neotropical forms it is the one that has been far the most frequently sent to the British Museum.

The *reniformis* of Pallas, and presumably also of M. Simon, is quite a different species. It would have been to Pallas's credit if he had conceived the likelihood of this before censuring Brown for the inaccuracy of his figure. It would indeed have been odd if Brown's figure had fitted Pallas's specimen, seeing that the former was the representation of an example differing from the latter in well-marked specific, if not in generic, characters.

Supplementary Note on the Freshwater Decapod Fauna of St. Vincent.

In the 'Annals and Magazine of Natural History,' (6) iii. pp. 6-22 (1889), I published an account of the freshwater and land Decapoda obtained in Dominica by Mr. G. A. Ramage. The following list of the species of this group collected by Mr. H. H. Smith in St. Vincent shows that the Crustacean fauna of the two islands is very similar.

PSEUDOTELPHUSA DENTATA (*Latreille*).

Thelphusa dentata, *Latr. Encycl.* x. p. 564.

Boscia dentata, *Milne-Edwards, Hist. Nat. Crustacea*, ii. p. 15, pl. xviii. fig. 14.

Pseudotelphusa tenuipes, *Pocock, Ann. Mag. Nat. Hist.* (6) iii. pp. 7-9.

St. Vincent.

An examination of the series of examples of this species sent home by Mr. Ramage and Mr. Smith has convinced me that they are probably after all to be referred to *P. dentata* of Latr. Milne-Edwards's figure of the dactylar segment of the legs, upon which I formerly relied, is most likely inaccurate.

PALÆMON JAMAICENSIS (*Herbst*)*.

Vide Ortmann, *Zool. Jahrb.* v. p. 729.

Cumberland and Chateaubilair Rivers.

* In my Report upon the Crustacea of Dominica I wrongly followed Mr. Spence Bate in terming this genus *Bithynis*.

PALÆMON OLFERSII, *Wiegmann*.

Palæmon Olfersii, *Wiegmann, Arch. Naturg.* 1836, p. 150.

Palæmon spinimanus, *M.-Edwards, Crust.* ii. p. 399.

Palæmon Olfersii, *Ortmann, Zool. Jahrb.* v. p. 733.

Cumberland, Chateaubilair, and FitzHughes Rivers.

PALÆMON FAUSTINUS, *Saussure*.

Palæmon faustinus, *Saussure, Mém. Crust. nouveaux du Mexique et des Antilles*, p. 53, pl. iv. fig. 30 (extract from *Mém. Soc. Phys. Genève*, 1858); *Ortmann, op. cit.* p. 734.

Cumberland and FitzHughes Rivers.

This species and *P. Olfersii* are possibly not distinct.

PALÆMON APPUNI, *von Martens*.

Palæmon appuni, *von Martens, Arch. f. Naturg.* xxxv. p. 31, pl. ii. fig. 5; *Pocock, Ann. Mag. Nat. Hist.* (6) iii. pp. 10-11, pl. ii. fig. 2; *Ortmann, Zool. Jahrb.* v. p. 722 (1891).

Cumberland and FitzHughes Rivers.

I reported this species with some hesitation from Dominica, having only one specimen for examination. The series, however, obtained by Mr. Smith has conclusively, to my mind, settled the question of the correctness of my identification.

ATYA OCCIDENTALIS, *Newport*.

Atya occidentalis, *Newport, Ann. Mag. Nat. Hist.* xix. p. 158 (1847); *Pocock, loc. cit.* pp. 11-16, pl. ii. fig. 3.

Cumberland and FitzHughes Rivers.

CARIDINA AMERICANA, *Guérin*.

FitzHughes River.

XIPHOCARIS ELONGATA, *Guérin*.

FitzHughes River.

The examples of this species that were obtained are of interest inasmuch as they serve largely to bridge over the structural interval between *X. elongata* and the form from Dominica to which I gave the name *intermedia*.

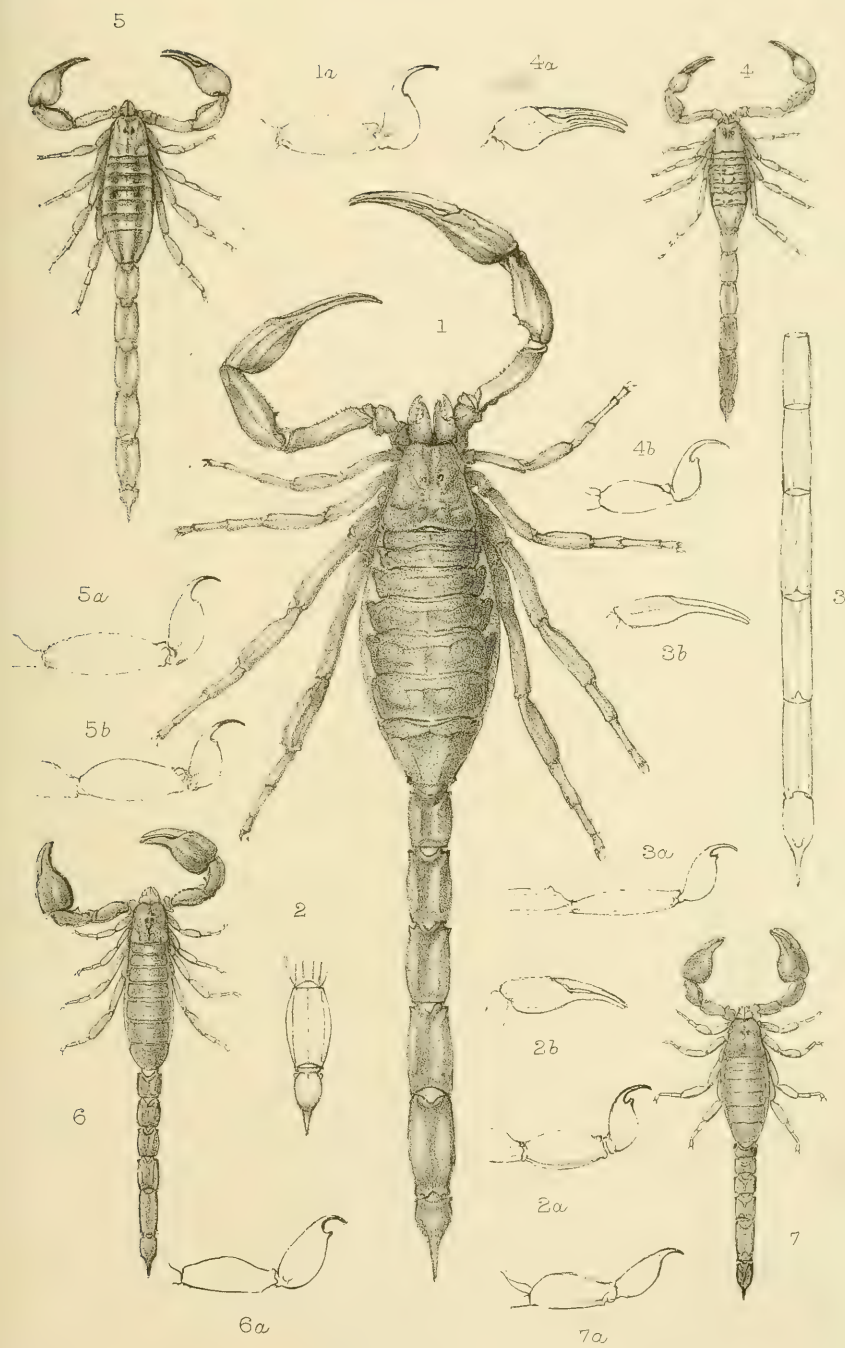
EXPLANATION OF THE PLATES.

PLATE XXIX.

- Fig. 1. *Tityus insignis*, Pocock, nat. size.
 1 a. " " " extremity of tail.
 2. *Tityus americanus* (Linn.), extremity of tail, from below, ♂.
 2 a. " " " " " from the side, ♂.
 2 b. " " " " " manus of ♂.
 3. *Tityus androcottoides* (Karsch), tail of ♂ from below.
 3 a. " " " " " extremity of tail of ♂ from the side.
 3 b. " " " " " manus of ♂.
 4. *Tityus melanostictus*, sp. n., ♂, nat. size.
 4 a. " " " " " ♂, manus.
 4 b. " " " " " extremity of tail.
 5. *Centrurus nitidus*, Thor., ♀, nat. size.
 5 a. " " " " " extremity of tail, ♂.
 5 b. " " " " " " ♀.
 6. *Diplocentrus antillanus*, sp. n., nat. size.
 6 a. " " " " " extremity of tail.
 7. *Broteochactas nitidus*, Pocock, nat. size.
 7 a. " " " " " extremity of tail.

PLATE XXX.

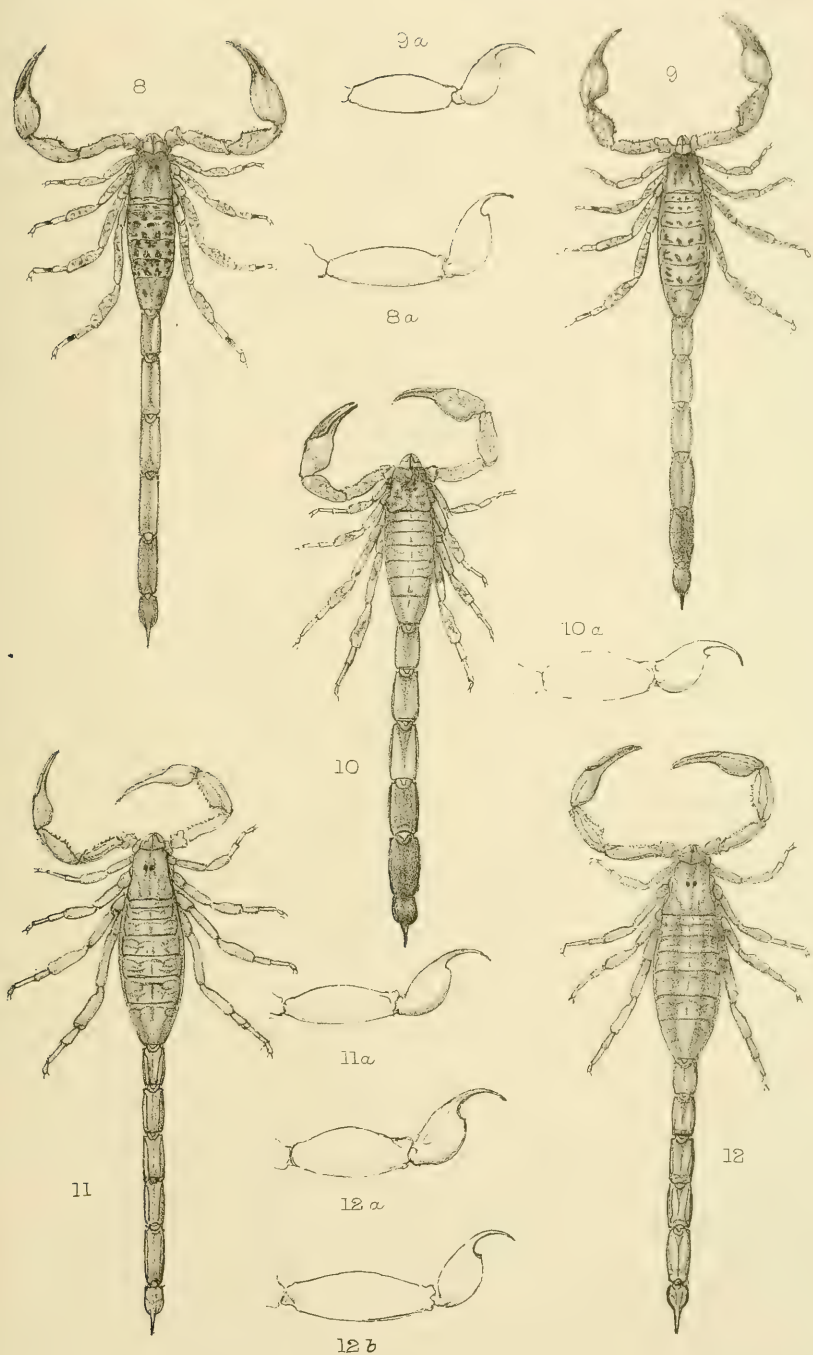
- Fig. 8. *Tityus pictus*, sp. n., ♂, nat. size.
 8 a. " " " " " extremity of tail.
 9. *Tityus Smithii*, sp. n., ♂, nat. size.
 9 a. " " " " " extremity of tail.
 10. *Tityus obtusus* (Karsch), ♂, nat. size.
 10 a. " " " " " extremity of tail.
 11. *Centrurus testaceus* (De Geer), ♀, nat. size.
 11 a. " " " " " extremity of tail.
 12. *Centrurus insulanus*, Thor., ♀, nat. size.
 12 a. " " " " " extremity of tail.
 12 b. " " " " " ♂, extremity of tail.



C. Berjeau, del. ad. nat.

West, Newman imp.

SCORPIONS FROM W. INDIES.



C. Berjeau del. ad. nat.

West, Newman imp.